



Topical Fire Research Series

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Firefighter Injuries

FINDINGS

- 45,500 firefighters were injured on the fireground in 1999, twice that of civilians injured in fires.
- 10-year trends show that firefighter injuries are decreasing.
- 85% of firefighter injuries occurred at structure fires, mostly residential structures.
- Risk of injury to firefighters is twice as great at non-residential structure fires than at residential fires.
- 44% of firefighter injuries were either sprains/strains or bleeding/bruises/cuts/wounds.

Firefighting is an extremely dangerous profession. The firefighter's mission is to protect life and property. Each year, thousands of firefighters are injured in the performance of their duties.

This paper examines the trends and factor related to firefighter injuries. The 1999 data are from the annual survey by the National Fire Protection Association (NFPA); the 1998 data are from the National Fire Incident Reporting System (NFIRS). (1998 is the most recent year in which NFIRS data are available.)

In 1999, firefighters suffered 88,500 injuries while on duty. Sixty-six percent of these injuries occurred while firefighters performed duties on emergency scenes (fireground and non-fire emergency). An additional 7% of injuries occurred while responding to or returning from emergency scenes.

In 1999, 45,500 firefighters were injured on the firegrounds and 13,565 at non-fire-related emergency scenes (Figure 1). Injuries to firefighters on the fireground in 1998 were double those of civilian injuries.

Figure 1. Type of Duty When Injured (1999)

DUTY	TOTAL INJURIES	% OF TOTAL
Responding To/Returning From Incident	5,890	7
Fireground	45,500	51
Non-Fire Emergency	13,565	15
Training	7,705	9
Other On Duty	15,790	18
Total	88,500	100

WHERE FIREFIGHTER INJURIES OCCUR

Eighty-five percent of firefighter injuries on the fireground in 1998 occurred at structure fires. The remaining 15% of injuries occurred at outside, vehicle, and other fires.

As shown in Figure 2, residential structure fires dominate firefighter injury statistics (60%). This is nearly two and a half times the number of injuries as in non-residential structure fires. Half of the firefighter injuries at structure fires in 1998 occurred at one- or two-family dwelling fires. Apartment fires accounted for 18% of injuries.

It is at non-residential structure fires, however, where firefighters are at greatest risk (Figure 3). In 1998, 50 firefighters were injured per thousand fires at non-residential structure fires versus 23 per thousand at residential structures. Non-residential fires are usually much larger than residential fires.

In 1998, 91% of fireground-related injuries to firefighters occurred above ground. Nearly 37% of injuries to firefighters occurred outside, above grade and 35% occurred inside, above grade (Figure 4).

FIREFIGHTER ACTIVITY AT TIME OF INJURY

Three major activities that the firefighter performs on the scene accounted for 73% percent of injuries in 1998:

- Fire extinguishment (43%)
- Suppression support (22%)
- Miscellaneous at scene (8%)

**Figure 2. Firefighter Injuries by Property Type (1998)
(Structure Fires Only)**

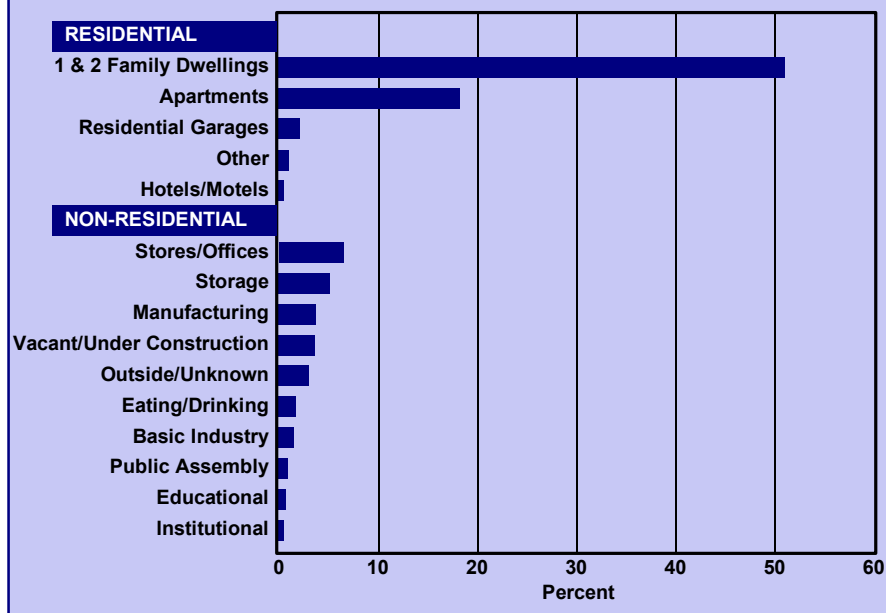


Figure 3. Per Fire Injury to Firefighters in Structures (1998)

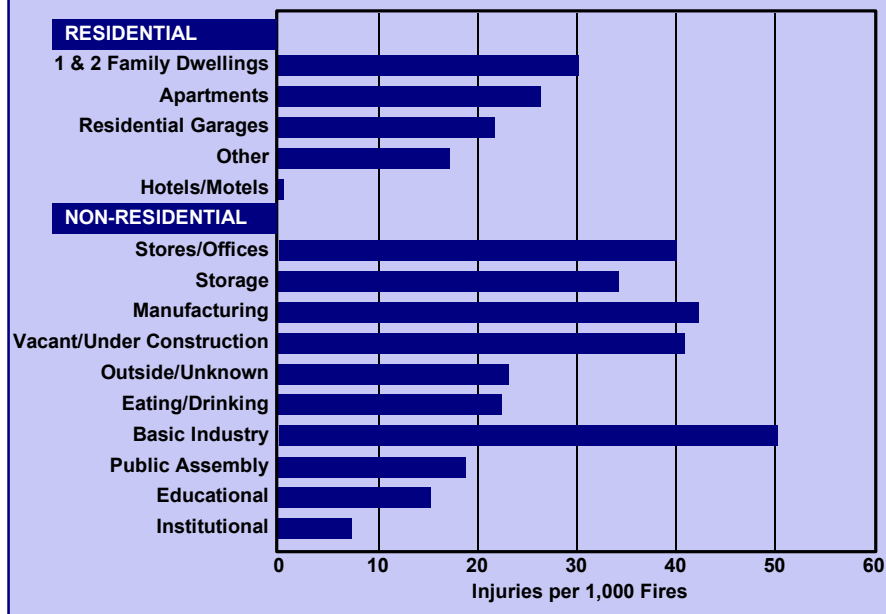
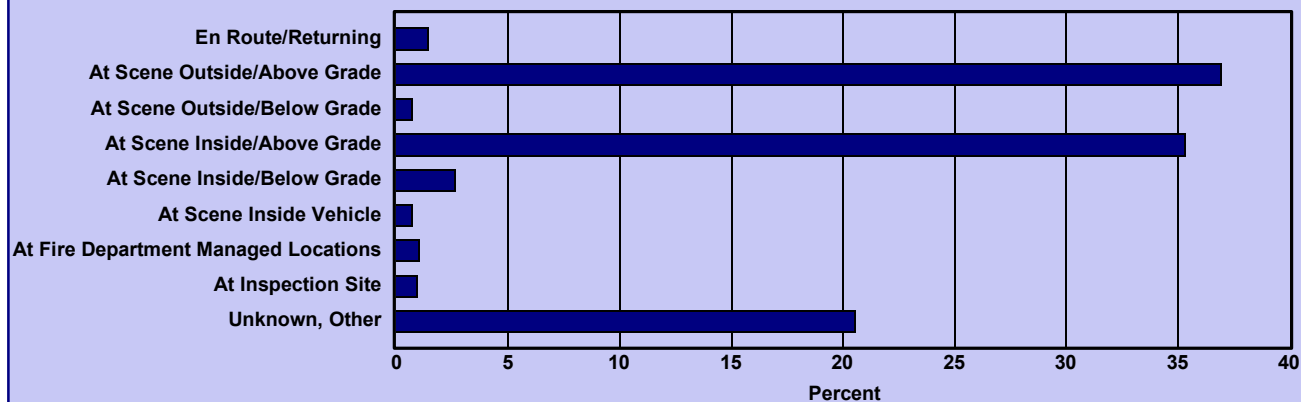


Figure 4. Firefighter Injuries (All Fires) by Where Injury Occurs (1998)



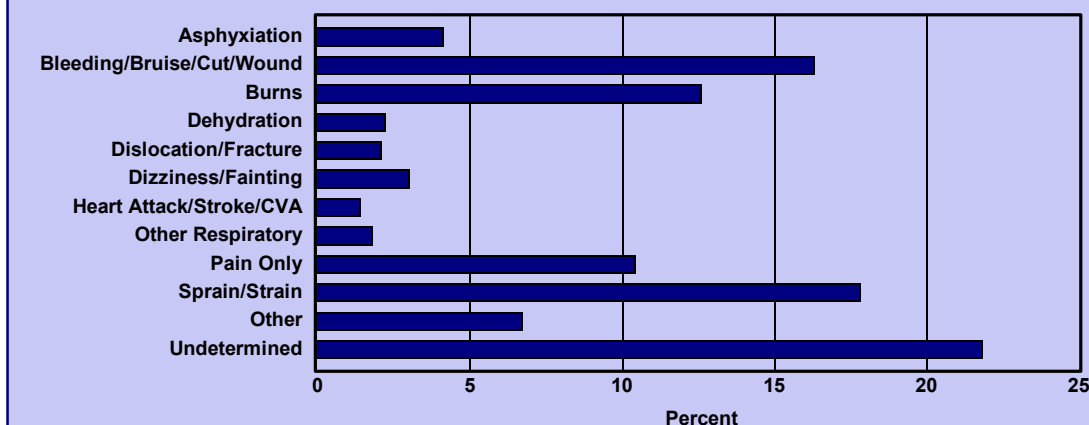
TYPE OF FIREFIGHTER INJURY

Trauma was the leading nature of injury to firefighters in 1998. Sprains/strains and bleeding/bruise/cut/wound combined

accounted for 44% of injuries; burns and pain accounted for an additional 23% (Figure 5). Heart attacks, internal trauma, and asphyxiation combined represented 16% of injuries, although these

accounted for 89% percent of firefighter fatalities. Forty-three percent of injured firefighters were treated at hospitals. Thirty-eight percent were treated at the scene but not transported to a hospital.

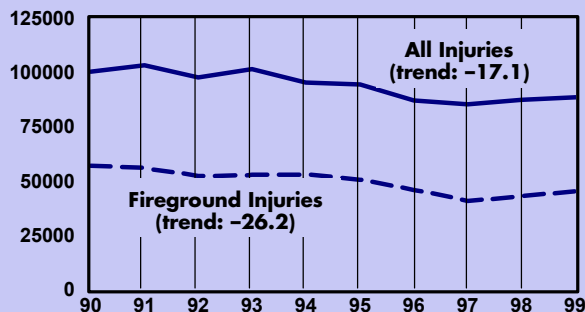
Figure 5. Firefighter Injuries by Nature of Injury (1998)



TRENDS

From 1990 to 1999, total firefighter injuries have trended down -17% (Figure 6) and fireground injuries -26%. These improvements were driven by significant injury reductions since 1994. However, both total and fireground injuries increased in 1999 to levels not seen since 1995 and 1996, respectively.

Figure 6. Trends in Firefighter Injuries



EXAMPLES

- On June 17, 2001, three firefighters were killed and 80 other emergency services personnel were injured in an explosion at a hardware store in New York City. The explosion occurred shortly after crews appeared to have the blaze under control. Sixty-two of the injured were taken to area hospitals. The majority suffered sprains/strains, lacerations, and other wounds. The New York City Fire Marshal Office believes that fumes

from heated cans of paint thinner and other flammable materials caused the deadly explosion.¹

- On May 1, 2001, eight firefighters were hospitalized after a fire ripped through a row of water-front townhouses in Maryland causing nearly \$2 million in damages. Two of the injured firefighters sustained first- and second-degree burns to 50% of their bodies. Another firefighter suffered from smoke inhalation. Five others

were transported to a local hospital and treated for minor injuries.²

- An early morning fire on May 10, 2001, in an apartment in Homestead, Pennsylvania, caused injuries to two firefighters who had to be hospitalized. One firefighter complained of chest pains, and the other was injured by falling debris. The blaze broke out in a second-story apartment above a bar. Flames spread to a vacant apartment building behind the bar and to a vacant three-story building.³

Footnotes:

1. "A Routine Fire, Then a Blast and a Mayday From Inside," *New York Times*, June 19, 2001.
2. www.Firehouse.com
3. WTAE-TV, the pittsburghchannel.com